ENVIRONMENTAL ASSESSMENT
FOR
UPGRADING THE PERIMETER FENCE
AT
REDSTONE ARSENAL, ALABAMA

DIRECTORATE OF ENVIRONMENT AND SAFETY
U.S. ARMY GARRISON – REDSTONE ARSENAL

JULY 2004

DEPARTMENT OF THE ARMY
REDSTONE ARSENAL

FINDING OF NO SIGNIFICANT IMPACT ENVIRONMENTAL ASSESSMENT FOR UPGRADING THE PERIMETER FENCE AT REDSTONE ARSENAL, ALABAMA

JULY 2004

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FINDING OF NO SIGNIFICANT IMPACT FOR ENVIRONMENTAL ASSESSMENT FOR UPGRADING THE PERIMETER FENCE AT REDSTONE ARSENAL, ALABAMA

DESCRIPTION OF THE PROPOSED ACTION: The Proposed Action is to install, repair, and/or replace, as necessary, the perimeter fence along the west, north, and east boundaries of the Installation. In addition, a "clear zone" would be established along the fence line to accommodate security efforts along the perimeter. Where possible, the clear zone would be 30-feet-wide on the interior of the fence. The Proposed Action is necessary to meet current Force Protection requirements of the Department of Defense (DOD Directive 5200.8, April 25, 1991; DOD Directive 2000.12, certified November 21, 2003; and Army Regulation 325-13).

ALTERNATIVES CONSIDERED: The only alternative considered other than the Proposed Action was the No Action Alternative. Under the No Action Alternative, the existing fencing (a combination of chain-link and barbed wire) would remain in place and current fence maintenance practices would continue. Areas currently fenced with barbed wire farm fence would continue to provide opportunities for easy access of unauthorized persons, potentially jeopardizing the safety of base personnel and military assets. In addition, unlawful entry into areas of the Installation where safety hazards exist (e.g., active or former test ranges) would not be reduced.

ENVIRONMENTAL EFFECTS: Eleven broad environmental components were considered to provide a context for understanding the potential effects of the Proposed Action and a basis for assessing the significance of potential impacts. The areas of environmental consideration were air quality, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, geology and soils, socioeconomics and water resources. Cumulative impacts of the Proposed Action were also analyzed.

MITIGATION MEASURES SUMMARY: Several Best Management Practices and permitting requirements were identified for the Proposed Action. Army Regulation 385-100, *Safety*, and all appropriate Occupational Safety and Health Administration regulations including 29 Code of Federal Regulations Part 1926, *Safety and Health Regulations for Construction*, would be followed during work activities. Due to the proximity of Proposed Action sites to active and former munitions ranges, the selected construction contractor(s) would receive a mandatory Unexploded Ordnance safety briefing prior to any work activity in areas of concern. Fugitive dust from ground disturbing activities would be reduced by up to 50 percent by regular site-watering practices. Work activities would be limited to daylight hours to limit construction-related noise.

Denuded upland areas would be revegetated with native species. Final results of 90% ground cover would be achieved in

accordance with the Installation's Erosion Control Plan. Vegetation removal in wetlands would be completed with the use of hand tools (no mechanized clearing would be conducted in wetlands) to avoid soil disturbance in wetlands. Removed vegetation and debris would not be placed in or adjacent to wetlands. Placement of aggregate material in a water of the U.S. due north of Martin Road along Zierdt Road, to allow for perimeter patrols, would require a dredge and fill permit from the Army Corps of Engineers and water quality certification from the Alabama Department of Environmental Management. A National Pollutant Discharge Elimination System permit would be required since ground disturbance activities are at least one acre. Erosion control measures would be implemented, such as the placement of hay bales, check dams, and silt fencing.

In order to assure impacts do not occur to National Register of Historic Places (NRHP) eligible sites, work activities on the site, including a 50 foot buffer from the site boundaries, would be limited to vegetation removal with the use of hand tools. Additionally, Federal cultural resource preservation statutes mandate that should an inadvertent discovery of cultural materials occur during construction, work must be stopped and the Installation Cultural Resources Manager notified. Should human remains be encountered, federal statutes specify that work shall cease immediately and the Cultural Resources Manager be notified.

No significant adverse impacts to any environmental resources examined in this document would be anticipated with implementation of the above-mentioned mitigation measures. Short-term positive socioeconomic impacts would be derived from the generation of construction work.

CONCLUSION: Environmental risks from the proposed construction activities examined in this document appear to be minor and mitigable. No significant environmental impacts were identified that would require the completion of an Environmental Impact Statement. Should you wish to review this Environmental Assessment for Upgrading the Perimeter Fence at Redstone Arsenal, Alabama, or comment on this action, please contact Ms. Pam Rogers, (256) 842-0561, Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-PA, Redstone Arsenal, AL 35898-5020, within thirty days from the date of this publication.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADEM Alabama Department of Environmental Management
AMCOM Army Aviation and Missile Command
AR Army Regulation
BMPs Best Management Practices
CAA Clean Air Act
CBMPP Construction Best Management Practices Plan
CEQ Council on Environmental Quality
CFR Code of Federal Regulations
CWA Clean Water Act
dB decibel
dBA A-weighted Decibels
DES Directorate of Environment and Safety
DoD Department of Defense
DoT Department of Transportation
EA Environmental Assessment
ECSA Ecologically Sensitive Area
EPA Environmental Protection Agency
ESA Endangered Species Act
Farm Fence 5-strand Barbed-wire Farm Fence
FE-6 6-foot FE-6 Chain-link Security Fence
FNSI Finding of No Significant Impact
IBDH Inches Wide at Diameter Breast Height
Ldn Day-night average sound level
MSA Metropolitan Statistical Area
NAAQS National Ambient Air Quality Standards
NEPA National Environmental Policy Act
NPDES National Pollutant Discharge Elimination System
NRHP National Register of Historic Places
NWI National Wetland Inventory (USFWS)
OSHA Occupational Safety and Health Administration
QCP Qualified Credentialed Professional
RSA Redstone Arsenal
SPCC Spill Prevention Control and Countermeasures
USACE United States Army Corps of Engineers
USC United States Code
USFWS United States Fish and Wildlife Service
UXO Unexploded Ordnance

INTRODUCTION

The National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense (DoD) Directive 4715.9, *Environmental Planning and Analysis* (U.S. Department of Defense, 1996), and 32 CFR Part 651, Army Regulation (AR) 200-2, *Environmental Analysis of Army Actions* (Department of the Army, 2002), which implements these laws and regulations, direct DoD and Army officials to consider environmental consequences when authorizing or approving Federal actions. Accordingly, this Environmental Assessment (EA) analyzes the potential environmental impacts associated with upgrading the perimeter fence at Redstone Arsenal (RSA), Alabama.

PROPOSED ACTION

The Proposed Action is to repair, replace and/or install, as necessary, perimeter fence along the west, north, and east perimeters of Redstone Arsenal (RSA). The fence alignments have been selected to take advantage of existing roads, trails, and rights-of-way to reduce the amount of clearing required. In most areas, new clearing would not be needed to meet security requirements, as many areas have been previously cleared. This project may be completed in phases based upon the priority of repair/replacement, environmental considerations and other factors. The following is a summary of the components of the Proposed Action provided by the Public Works Division, Construction Branch, of the Directorate of Public Works. Figure 1 depicts the locations of the proposed work areas.

Purpose and Need

Physical security is an important component of the Army's strategy to protect critical research and development activities, training programs, and other valuable missions that are necessary to ensure the warfighting capability is maintained in accordance with DoD Regulation 5200.8-R, dated May 1991. Army Regulation 325-13, states that "commanders will ensure that [antiterrorism] specific security procedural and physical measures are employed to protect personnel, information, and material resources from terrorist threats." The purpose of upgrading the existing fencing along the Installation's boundary is to support the Army's overall anti-terrorism and force protection program. Recent threat assessments indicate more emphasis is needed to ensure that basic security measures are operational and sustainable. Improving the security of the perimeter would also decrease the potential for accidents to occur on the Installation's test ranges due to unauthorized entry into those areas. Department of the Army's Physical Security Field Manual (Field Manual No. 3-19.30, January 2001) states that "clear zones should be kept clear of weeds, rubbish, or other material capable of offering concealment or assistance to an intruder attempting to breach the barrier. A clear zone 20-feet-wide should exist between the perimeter barrier and exterior structures, parking areas, and natural and man-made features. When possible, a clear zone of 50 feet or more should exist between the perimeter barrier and structures within the protected area, except when a building's wall constitutes the perimeter barrier."

ALTERNATIVES OF THE PROPOSED ACTION

Two Alternatives were considered: Alternative 1 (Preferred Alternative), to upgrade (repair and/or replace) the existing perimeter fence and Alternative 2 (No-Action Alternative), to leave the existing fence as is, with repair and maintenance performed as necessary. There is currently no fencing in place that follows the installation boundary along the Tennessee River shoreline and no work activity would take place that would involve the construction of fencing that follows the shoreline.

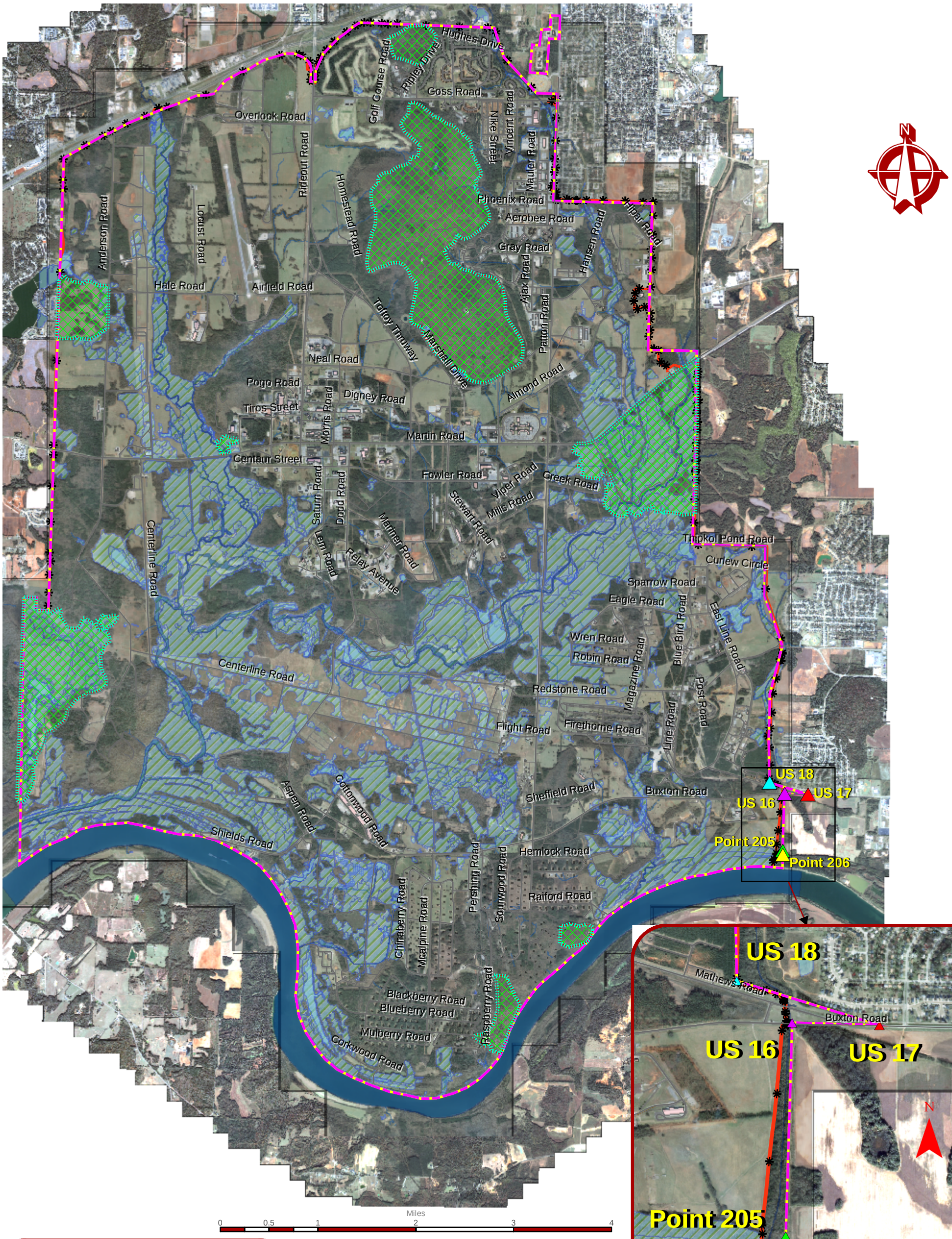
Alternative 1 (Preferred Alternative)

West Martin Road (Gate 7) south to the Tennessee River

Remove the existing 5-strand barbed-wire farm fence and install a 6-foot FE-6 chain-link Security Fence (FE-6) from the west Martin Road entry point (Gate 7) south along Zierdt Road to a point where the RSA boundary turns west. A 30-foot clear zone would be established by clearing vegetation on the inside of the fence. A steel cable with flotation buoys would be installed across Indian Creek and attached to an existing post on each side of the creek. Fallen trees on the creek banks would be removed. South from the point where the boundary turns west to the Tennessee River the existing farm fence would be left in place and no clearing would be completed.

Installation Boundary

U.S. Army Garrison - Redstone Arsenal, Alabama



Map Legend

BOUNDARY SURVEY PTS.

- Point 205
- Point 206
- US 16
- US 17
- US 18
- INSTALLATION BOUNDARY
- **IKONUS 1M COLOR**
- **6 IN COLOR ORTHO**
- **ECOLOGICALLY SENSITIVE AREA**

WATER AREA

- DRY
- INTERMITTENT
- PERMANENT
- WETLANDS
- RIVERS & STREAMS
- ROADS
- BUILDINGS
- EXISTING FENCE

Map Projection: Transverse Mercator
Horizontal Datum: North American Datum 1983
Grid Coordinate System: State Plane Coordinates, Alabama East
Planer Distance Units: Survey Feet (U.S.)

Data Provided by: Directorate of Environment and Safety
& Directorate of Public Works
U.S. Army Garrison - Redstone
Redstone Arsenal, Alabama, USA

Map Prepared by: Timothy Heinse
AMTEC Corp.
Huntsville, AL
07-12-2004

Directorate of Environment and Safety
U. S. Army Garrison Redstone
Redstone Arsenal, Alabama

West Martin Road (Gate 7) around north perimeter then south to East Martin Road (Gate 1)

West Martin Road (Gate 7) to Rideout Road (Gate 9)

Repair and replace existing FE-6 fence, as necessary, from the intersection of Zierdt Road and Martin Road, near Gate 7, to the north entrance on Rideout Road at Gate 9. A 30-foot zone on the inside of the fence would be cleared of vegetation. A rough aggregate perimeter trail would be constructed on the inside of the fence through a small wetland area, approximately ¼-mile north of Martin Road.

Rideout Road (Gate 9) to East Martin Road (Gate 1)

Repair and replace existing FE-6 fence, as necessary, from Rideout Road (Gate 9) to Goss Road (Gate 8) to Patton Road (Gate 10) to the City of Huntsville Steam Plant. Vegetation growing within the existing chain-link fence will be sprayed with herbicide and subsequently removed by hand. Herbicide treatments made along the boundary fence traveling east of Gate 10 must be coordinated with adjacent private residents to ensure inappropriate damages do not occur. From the steam plant to Martin Road (Gate 1), the existing barbed wire fence will be replaced with new FE-6 fence. A 30-foot clear zone will be established inside the fence for this area.

East Martin Road (Gate 1) to Tennessee River

The following descriptions are provided from the north to the south.

Martin Road (Gate 1) to Redstone Road (Gate 3)

Vegetation clearing in this area would consist of removing trees and brush, as necessary, to gain access to the work zones and complete the work detailed below. No new clear zones would be completed for this area.

- install a FE-6 fence beginning on the south right-of-way of Martin Road, for a distance of 300 feet;
- remove existing farm fence and replace with new 5-strand farm fence from the end of this section until the boundary turns east;
- repair the existing 5-strand farm fence along the next section running west-east; and
- remove the existing farm fence and T-posts and install a FE-6 fence along this north-south section ending at Redstone Road (Gate 3).

Redstone Road (Gate 3) to Buxton Road (Gate 2):

Vegetation clearing in this area would consist of removing trees and brush, as necessary, to gain access to the work zones and complete the work detailed below.

- install a FE-6 fence for 330-linear-feet along the existing fence line to an angle break in the fence and clear vegetation 12 feet on the outside of the fence and 30 feet on the inside of the fence;
- remove and replace the existing farm fence from the end of the above mentioned FE-6 fence south along the RSA boundary until a point in the old South Thiokol Area where FE-6 fence already exists; and
- install a FE-6 fence for the remainder of the boundary to the north side of Buxton Road (Gate 2).

Buxton Road (Gate 2) to the Tennessee River:

A 5-strand farm fence would be installed along the Installation boundary. Only those few trees necessary for the installation of the fence will be removed (not a 30 foot clear zone).

Alternative 2 (No-Action Alternative)

Under the No Action Alternative, the existing fencing (a combination of chain-link and barbed wire) would remain in place. The existing fence would continue to be repaired and maintained. Existing cleared areas would continue to be maintained. This alternative would have a potentially negative impact on mission effectiveness as areas currently fenced with farm fence would continue to provide opportunities for easy access and unauthorized entry into restricted areas of the Installation where safety hazards exist (e.g., active or former test ranges).

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The areas of environmental consideration for the Proposed Action are air quality, biological resources, cultural resources, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, geology and soils, socioeconomics and water resources.

The assessment of potential environmental impacts and the determination of their significance are based on the requirements in 40 CFR 1508.27. Impacts are evaluated at three levels: (1) No impact—no impact is predicted; (2) No significant impact—impact is predicted, but the impact does not meet the intensity/context significance criteria for the specific resource; and (3) Significant impact—an impact that meets the intensity/context significance criteria for the specific resource is expected.

Thresholds for determining impact significance are based on the applicable compliance standard. When feasible, these criteria correspond to federal- or state-recognized criteria and are determined using the associated standardized methods. In the absence of compliance standard(s), the thresholds are based upon federal- or state-recommended guidance or follow professional standards/best professional judgment. The criteria and associated thresholds, which have been tailored to the environmental conditions at RSA, are presented in Appendix C.

Air Quality

Under the Clean Air Act (CAA), federal actions must not cause or contribute to any new violation of air quality standards, increase the frequency or severity of any existing violation, or delay the timely attainment of any air quality standard or interim milestone.

Redstone Arsenal is in Madison County, which has an attainment designation for all primary and secondary pollutant standards stipulated under the National Ambient Air Quality Standards (NAAQS), based on monitoring by the City of Huntsville Department of Natural Resources. Madison County and the City of Huntsville, along with Limestone County, compose the Huntsville Metropolitan Statistical Area (MSA) (Mims, 2000). The Huntsville MSA and RSA are in attainment for all federal air quality standards.

The State of Alabama Department of Environmental Management (ADEM) issues air permits for RSA. RSA has a Title V Air Permit (Permit # 7090007) issued July 7, 2003 by ADEM that allows RSA to regulate all emission sources under one permit. The permit does not impose maximum emission limits since there are no major air emission sources on RSA.

Land clearing-related activities associated with the Proposed Action would generate fugitive dust (particulate matter) and vehicles and equipment would emit small quantities of carbon monoxide, oxides of nitrogen, sulfur dioxide, and hazardous air pollutants. Dust emissions would vary with the level of activity, the specific operation, and prevailing meteorological conditions. Emissions are anticipated to be below the regulated amounts for clean air standards (Appendix D). Since the Huntsville MSA is an attainment area for all federally regulated pollutants, the proposed construction activities would not have a significant impact on the area air quality.

Contractors would be required to implement and follow construction Best Management Practices (BMPs) and ensure that construction vehicles contain standard vehicle emissions control devices. Fugitive dust from ground-disturbing activities could be reduced up to 50 percent by regular site-watering practices, as necessary. Additional control options for reduction of fugitive emissions from open sources during general construction are presented in Appendix C.

Biological Resources

Wetlands- Section 404 of the Clean Water Act (CWA) requires that the United States Army Corps of Engineers (USACE) regulate and permit dredge and fill activities in waters of the United States. Section 404(a) authorizes the USACE to issue permits for fill in navigable waters, including wetlands. The regulatory definition for waters of the United States is, "all waters covered by Section 10 of the Rivers and Harbors Act; all interstate waters and interstate wetlands; all other waters (of various types) which could be used in interstate commerce; all impoundments of waters of the United States; tributaries of the above waters; territorial seas of the United States; and wetlands adjacent to waters identified in this section".

Most United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapped wetlands occur along the southwestern and eastern portions of the Proposed Action areas. These wetland areas drain into the Tennessee River and/or directly recharge aquifers with shallow water tables. Figure 1 illustrates the locations of NWI wetlands in the Proposed Action areas. Prior to work activities the Garrison's Directorate of Environment and

Safety (DES) personnel would delineate waters of the U.S., including wetlands, under the jurisdiction of the USACE. Vegetation removal in wetlands (indicated on Figure 1) would be completed with the use of hand tools or by mechanically shredding the trees to ground level to avoid soil disturbance in wetland areas. Tree stumps will be mechanically shredded to the surface level of the ground. In wetland areas (Figure 1), vegetation will only be removed to the minimum extent required for the repair/replacement of the fence. More specific information regarding wetland impacts is provided below.

A rough aggregate road will be constructed approximately ¼ mile north of Martin Road near the western boundary of the installation. A Section 404 permit will be required for the construction of the road. No wetland soils will be disturbed and no fill will be placed in any other wetland areas (other than the aggregate road) which will eliminate the need for a Dredge and Fill Permit from the USACE over most of the project area.

Vegetation - New clear zones on the inside and outside of the fence will only be established in a few places as defined in the Proposed Action. No new clear zones would occur in wetland areas other than that required for the construction and/or repair of the fence. Where new clear zones would not be established, trees along the fence line, generally two feet on either side of the fence, would be removed to provide access to work areas, with larger trees left in place. Treetops and limbs would be placed in adjacent forested areas, chipped, or piled and burned, outside of surface waters, including wetlands. All tree stumps would be shredded to ground level. Fields would be mowed to remove tall weeds, brush and small trees. Vines and trees that have grown into the fence would also be removed.

A swath approximately 20 to 30-feet-wide has been cleared of trees over the last 10 years along most of the existing interior fenceline, with the exception of wetland areas and a few upland areas (e.g., south of Buxton Road). In these cleared areas along the fenceline disturbance-following species like sassafras (*Sassafras albidum*), Johnson grass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), dallis grass (*Paspalum dilatatum*), trumpet creeper (*Campsis radicans*), redbud (*Cercis canadensis*), passion flower (*Passiflora spp.*), common sumac (*Rhus glabra*), poison ivy (*Toxicodendron radicans*), Chinese privet (*Ligustrum amurense*), blackberry (*Rubus trivialis*) and Japanese honeysuckle (*Lonicera* japonica) are present. The following is a summary of existing forested upland and wetland vegetation that would need to be cleared under the Proposed Action.

West Martin Road (Gate 7) south to the Tennessee River

Planted loblolly pines (*Pinus taeda*) [4-10 inches at diameter breast height (IDBH)] dominate the Proposed Action area south of Martin Road along Zierdt Road for approximately one mile. Scattered hackberries (*Celtis occidentalis*), sweet gums (*Liquidambar styraciflua*), eastern red cedars (*Juniperus virginiana*), and supple-jack (*Berchemia scandens*) are also present along this segment. A NWI wetland is mapped within this area. Further south the majority of the area inside the existing fence is mostly cleared to a point where the RSA boundary turns west. From this point south to the Tennessee River, vegetation would not be cleared to avoid impacts to the Wheeler National Wildlife Refuge.

West Martin Road (Gate 7) north to I-565 then east to Rideout Road (Gate 9)

The majority of this segment has been previously cleared. A NWI wetland occurs immediately north of Martin Road along Zierdt Road. Small black willows (*Salix nigra*) (1-4 IDBH) and red maples (*Acer rubrum*) (2-6 IDBH) dominate this area. The herbaceous layer is composed mostly of cattails (*Typha latifolia)* and lizard's tail (*Saururus cernuus*). A large willow oak (*Quercus phellos*) (10-12 IDBH) is present on the southern end of the wetland. This wetland would be filled to construct a road to allow for vehicular passage. A dredge and fill permit from the ACOE and water quality certification from ADEM would be required. Another NWI wetland occurs further north near the intersection of Zierdt Road and Edgewater Drive. The southern end of this wetland is seasonally ponded and was covered with spatter-docks (*Nuphar luteum*). Cattails and sedges (*Carex spp.*) are present to the north of the ponded area. The northern end of this NWI wetland is vegetated with more facultative wetland species like black willows and red maples (most are 2-6 IDBH), with a few box elders (*Acer negundo*), tulip poplars (*Liriodendron tulipifera*), hackberries and sycamores (*Platanus occidentalis*). Three large water oaks (*Quercus nigra*) (8-14 IDBH) exist in this northern section. The areas north of this wetland and east along the northern perimeter to Indian Creek are mostly clear except for occasional trees such as sweet gums and loblolly pines occurring along the edges of the work zone. Indian Creek has an overstory consisting of sycamores and tulip poplars (2-24 IDBH) and an understory consisting of green ash (*Fraxinus pennsylvanica*) and box elder (2-6 IDBH). Planted loblolly pines (4-8 IDBH) dominate the Proposed Action area east of Indian Creek to Rideout Road. In addition, the area contains numerous small eastern red cedars, hackberries, and American elms (*Ulmus americana*).

Rideout Road (Gate 9) to East Martin Road (Gate 1)

The majority of this segment is cleared. Occasional trees, mostly loblolly pines (2-12 IDBH) occur along the edges of the proposed work zone. Patches of vegetation consisting mostly of easten red cedars, sweetgums, sycamores, willows and oaks (*Quercus* spp.) (1-12 IDBH) occur due north of the steamplant along Triana Blvd. South of the end of Triana Blvd after the boundary turns east, an upland area is vegetated with young loblolly pines and eastern red cedars (1-4 IDBH) with larger loblolly pines (9-15 IDBH) occurring occasionally. Box elders, silver maples (*Acer saccharinum*), sweet gums, tulip poplars, hackberries, sycamores, willows and water oaks are present along Huntsville Spring Branch. Most of these trees are less than 12 IDBH, with a few larger specimens present, especially oaks. This wetland community continues to the south along the boundary until the perimeter meets Martin Road. However, the majority of the area has been previously cleared where an old road occurs.

East Martin Road (Gate 1) to Buxton Road (Gate 2)

A 330-foot section due south of Martin Road is vegetated with large willow oaks (24+ IDBH) with an understory of green ash and hackberries less than 12 IDBH. No other new clear zones would be created in this section.

Buxton Road (Gate 2) to the Tennessee River

This area is vegetated with dense forest. Large oaks, loblolly pines, sycamores and eastern red cedars are present in the overstory. Most of these trees are 6-12 IDBH with some larger specimens, predominantly oaks and loblolly pines. Redbuds, box elder, hackberries, green ash, sweet gums and cherries (*Prunus* spp.) are present in the understory. Most of these trees are less than 4 IDBH.

During construction activities, hardwood trees in any of the areas that do not interfere with fence work activities would be saved if their trunks are five IDBH or greater and they are determined to be healthy. Trees to be saved would have three stakes placed at least ten feet away from the trunks with barrier flagging stretched around the stakes to protect the trees from construction equipment. No hardwoods greater than 5 IDBH would be removed from the site without coordination with the Garrison's DES.

Wildlife- The *Integrated Natural Resources Management Plan for the Redstone Arsenal* (May, 2002) contains information on commonly occurring wildlife species on RSA. Protected and sensitive wildlife species are discussed below.

Sensitive and Protected Species –Section 7 of the Endangered Species Act of 1973 (ESA) (16 United States Code (USC) 1536) requires all federal agencies to consult with the appropriate wildlife management agencies. All federal agencies shall insure that their actions "are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of critical habitat. Section 9 makes it unlawful to take or possess any threatened or endangered animal or plant species. Section 11 (16 USC 1540) provides both civil and criminal penalties. Alabama has not enacted specific endangered species legislation, but has promulgated regulations that provide protection for certain non-game species. These regulations include "Alabama Non-game Regulation" (Chapter 220-2-92) and "Alabama Invertebrate Species Regulation" (Chapter 220-2-98). These regulations make it unlawful to take, capture, kill, or attempt to take capture, or kill protected species without a scientific collection permit. Protected species that are known to occur or have a potential to occur within the Proposed Action area are summarized below in Table 1.

Table 1: Identified and Potentially Present Protected and Sensitive Species in the Vicinity of the Proposed Action Areas

Common Name	Scientific Name	State Status	Federal Status	Habitat
Alabama Cave Shrimp	*Palaemonias alabamae*	State Protected	Listed Endangered	Cave systems
Southern Cave Fish	*Typhlichtys subterraneus*	State Protected	None	Cave systems
Gray Bat	*Myotis grisescens*	State Protected	Listed Endangered	Forested creeks
Bald Eagle	*Haliaeetus leucocephalus*	State Protected	Listed Threatened	Large wetland/open water areas
American Alligator	*Alligator Mississippiensis*	State Protected	Listed Threatened due to similarity of appearance with the American crocodile	Back swamps and open waters of reservoirs

Reference: Endangered Species Management Plan for Redstone Arsenal, 2002

Unique Areas – Ecologically Sensitive Areas (ECSAs) on RSA consist of biologically significant communities that are home to federal- or state-listed species, including candidate species, or habitats containing single populations or groups of unique or rare species. These areas are protected by the ESA because they serve as habitat for federally listed species or by state law because they support state-protected species. In addition, the Alabama Cave Protection Act protects the biological life in caves, as well as speleothems (cave formations). The proposed work areas pass through and/or border four ECSAs, as shown in Figure 1. The following is a summary of these four ECSAs.

- Bradford Sinks-Swan Pond ECSA – A wetland complex containing springs, blue holes, and bottomland hardwood communities found in the southwestern portion of the Installation, adjacent to the Wheeler National Wildlife Refuge, that is undisturbed and contains suitable habitat for several protected species;
- Ward Mountain ECSA – A mature oak-hickory forest community found adjacent to the northeastern border of the Installation that is undisturbed and known to support one rare plant species;
- Huntsville Spring Branch ECSA – A wetland complex containing an undisturbed portion of Huntsville Spring Branch Creek and associated bottomland hardwood forests found on the southeastern portion of the Installation that is adjacent to and upstream of the Wheeler National Wildlife Refuge, and known to support a sensitive plant; and
- Bobcat Cave ECSA – A limestone cave complex in the northwest portion of the Installation that is known to support protected species.

Direct impacts to sensitive and protected species and their habitat(s) would be avoided. Measures would be taken to ensure that there would be no indirect impacts due harmful discharges (e.g., pesticides, herbicides, saline solutions solvents, oils, greases, etc.) to groundwater or surface water during or after construction activities in the Bobcat Cave ECSA. Moreover, in accordance with the Installation's Pest Management Plan (December 2002), no pest management operations involving the application of pesticides would be conducted in this area. Prior to work activities in ECSAs, DES personnel would be notified and specific project activities would be discussed and appropriate buffer zones established to protect sensitive and/or protected species and their habitats (e.g., establishing no work areas).

Cultural Resources

Cultural and archaeological resources are limited, nonrenewable resources whose potential for scientific research or value as a traditional resource may be easily diminished by actions, which significantly impact the integrity of the

property. Activities that disturb the ground where an archaeological site is present can destroy temporally and culturally diagnostic artifacts and features or alter artifact provenance. Such alterations to the integrity of a property preclude possible determination that the site may be likely to yield information important in prehistory or history. Significance of impacts is determined by the intensity and context of the alteration of the distinctive characteristics and integrity of a property. No historic buildings or structures are located in the proposed areas of work.

Cemeteries - Two cemeteries are located adjacent to the Proposed Action areas: Elko Cemetery and McDonald Cemetery. These cemeteries are fenced and would not be disturbed by the implementation of the Proposed Action in accordance with Alabama law. All cemeteries must have at least a 50-foot buffer.

Archaeological resources – Table 2 contains the general mitigation measures for archaeological sites that could be potentially affected by the proposed project. Most sites will be avoided by the proposed project. Work will occur in approximately 10 archaeological sites that are potentially eligible for the National Register. In five of these sites, including 1Ma196, 1Ma191, 1Ma639, 1Ma736, and 1Ma538, the proposed work will be to repair the existing fencing. Any fence posts to be replaced in these five sites would be replaced in the same post-hole. In three sites, 1Ma1181, 1Ma140/33, and 1Ma141, new 5 wire farm fence will be installed and agricultural type T-posts, driven to a depth of approximately 18 inches, will be used in the sites. There will be no effect from the proposed project on these eight sites (1Ma196, 1Ma191, 1Ma639, 1Ma736, 1Ma538, 1Ma1181, 1Ma140/33, and 1Ma141). On two sites, 1Ma172 and 1Ma281, the proposed work involves the new construction of FE-6 fencing, which require posts driven to a depth of approximately 3 feet every 10 feet. In these two sites, 1Ma172 and 1Ma281, an archaeologist will be used to dig the holes using appropriate methods of investigation. All sites described above will include a 50 foot buffer around the site. No work will occur on the sites until the SHPO concurs with the proposed work. Any proposed clearance around eligible sites will be conducted by hand or with approved mechanical equipment during dry weather. No tree stumps will be pulled from sites; the selected contractor will grind stumps to the ground level.

Table 2. Mitigation Requirements for Archeological Sites

Project Area	Proposed Work	NRHP Recommended Eligible Site(s) Present	Survey Report(s)	Mitigation Requirements
Rideout Road (Gate 9) to the intersection of Zierdt Road and Martin Road	Repair and replace fence as necessary and clear 30-foot zone on inside of fence.	1Ma158	Alexander et. al, Nov. 1998 and Feb. 2000	Avoid ground disturbance (e.g., placement of post holes and logging with heavy machinery) in 1Ma158 and 50-foot buffer zone or conduct further archeological investigation.
Intersection of Zierdt Road and Martin Road south to west turn in boundary (USFWS border)	Replace fence and clear 30 feet inside fence.	1Ma1057 and 1Ma172	Alexander et. al, June 2003 and Feb. 2000	Avoid ground disturbance in sites and within a 50-foot buffer zone or conduct further archeological investigation.
West turn in boundary (USFWS boundary) south to Tennessee River	No clearing in this area. Place steel cable over Indian creek with buoys.	1Ma1129, 1Ma1131, 1Ma1307 and 1Ma364	In Process, no final reports complete	Avoid ground disturbance in these site and within a 50-foot buffer zone or conduct further archeological investigation.
Rideout Road (Gate 9) east to Goss Road (Gate 8)	Repair and replace fence as necessary and clear 30-foot clear zone on inside of fence.	1Ma191, 1Ma196, 1Ma639 and 1Ma736	Alexander et. al, June 2003, Feb. 1999 and Nov. 1998. McNutt et al.1998b	Avoid ground disturbance in these sites and within a 50-foot buffer zone or conduct further archeological investigation
Goss Road (Gate 8) east to Martin Road (Gate 1)	Install new fence and clear 30 feet inside fence.	1Ma281	Alexander et. al, June 2002, Feb. 2000 and Nov. 1998.	Avoid ground disturbance in 1Ma281 and within a 50-foot buffer or conduct further archeological investigation.
Martin Road (Gate 1) south to Thiokol	Install new fence and clear trees as	1Ma1181	Alexander et. al, Oct. 2003,	Avoid ground disturbance in 1Ma1181 and within a 50-foot buffer zone and in

Pond Road	necessary to access site and perform work.		Feb. 1999, Southern half currently being surveyed	southern half of area. If SHPO concurs with report of southern half, then ground-disturbing activities are permitted in southern portion.
East to west running section along Thiokol Road	Minor repairs to new fence and tree clearing along fence.	Unknown	In Process	Avoid ground disturbance in entire section. Clearance by DES is required prior to work.
Thiokol Pond Road south to Redstone Road (Gate 3)	Replace fence and clear trees as necessary.	1Ma158	In Process	Avoid ground disturbance in entire section or conduct further archeological investigation. DES must be contacted prior to work.
Redstone Road (Gate 3) south to Buxton Road (Gate 2)	Install new fence and clear trees as necessary.	1Ma300	McNutt et al.1998; Alabama state file	Avoid ground disturbance in 1Ma300 and 50-foot buffer zone or conduct further archeological investigation.
Buxton Road to Tennessee River	Install new fence and clear 30 feet inside fence.	1Ma33, 1Ma140 and 1Ma 141	Alexander et. al, June 2001 and Feb. 2000.	Avoid ground disturbance in these sites and 50-foot buffer or conduct further archeological investigation.

Hazardous Materials and Waste

Several federal agencies oversee various aspects of hazardous material usage. The Department of Transportation (DOT) regulates the safe packaging and transporting of hazardous materials, as specified in 49 CFR Parts 171 through 180 and Part 397. The Occupational Safety and Health Administration (OSHA) regulates the safe use of hazardous materials in the workplace in 29 CFR, primarily Part 1910. Environmental Protection Agency (EPA) regulations are found in 40 CFR.

No impacts are anticipated from hazardous materials and waste with implementation of the following rules and regulations: (1) temporary storage tanks and other facilities for the storage of hazardous materials would be located in protected and controlled areas designed to comply with site-specific spill prevention and countermeasure plans; (2) the Installation's Spill Prevention, Control and Countermeasures (SPCC) Plan would be followed; (3) hazardous materials would be containerized and properly disposed of by the individual contractors in accordance with federal and state laws and regulations; (4) spills or discovery of a hazardous material or hazardous waste during construction would be quickly reported and remediated in accordance with the Installation's SPCC Plan; (5) hazardous materials and waste would not be stored on-site overnight to avoid inadvertent releases; and (6) hazardous waste would be disposed of off-site in accordance with all state and federal laws.

Health and Safety

Safety hazards associated with heavy equipment operation, working along traffic corridors, and tree-felling activities would exist. In addition, the potential presence of Unexploded Ordnance (UXO) in former and active test ranges near the Proposed Action areas could pose a hazard to project personnel. No impacts would be anticipated with implementation of the following: (1) construction materials would be delivered to the site by truck in accordance with U.S. Department of Transportation regulations; (2) Army Regulation 385-100, *Safety*, appropriate OSHA regulations including CFR 29 Part 1926, *Safety and Health Regulations for Construction* and Site Specific Health and Safety Plans would be followed during project activities; and (3) the selected contractor would be given regular mandatory UXO safety briefings and all activities within or adjacent to former or active ranges would be coordinated with the respective range safety personnel prior to any work activity. An area located in the northwest section of the installation near I-565 has been identified as a former mortar range and UXO awareness training (UXO anomaly avoidance or UXO construction support) for all workers conducting any intrusive work in this area will be required.

Infrastructure and Transportation

No impacts are anticipated since traffic would only be temporarily delayed to allow construction vehicles to safely enter and exit work areas and to slow the flow of traffic adjacent to active work zones. No modifications to the existing transportation system would occur.

Land Use

The southeastern quadrant of the Installation is identified for use by production facilities, except for a small segment south of Martin Road, which is utilized for recreational purposes. The eastern boundary zone north of Martin Road is utilized primarily for training activities. Family housing is situated in the northeastern corner of the Installation, west of Patton Road and north of Goss Road. Community facilities are located south of Goss Road and west of Patton Road. The area east of Rideout Road is designated for recreational use. The area west of Rideout Road is designated for Installation maintenance and utilities. Further west are training facilities. The areas adjacent to the western perimeter and far westerly portion of the northern perimeter are utilized as test areas. No impacts would be anticipated to land use since: (1) project activities would be scheduled with the respective tenants to minimize impacts to their activities; (2) delays in normal activities (e.g., range testing) would be temporary; and (3) the Proposed Action would not permanently alter the existing land uses.

Noise

The decibel (dB) is the accepted standard unit for measuring the level of noise and is generally adjusted to the "A-weighted" logarithmic scale (dBA) to better correspond to the normal human response to different frequencies. Several metrics have been developed for multiple-noise event analysis. The one most commonly used is the (Day - Night Average Sound Level) LDN metric. This is the dBA level averaged over a 24-hour period, with an additional ten-dBA penalty added for noise events occurring between 10 p.m. and 7 a.m. (because noise at night is judged to be more annoying than noise during the day). The threshold noise level for compatible land uses is an LDN of 65 dBA. Areas outside (less than) the 65 dBA LDN contour are compatible with residential and other noise-sensitive land uses. Noise levels along the northwestern and northeastern perimeters are of greatest concern due to the presence of adjacent residential areas. A variety of noise producing machines (e.g., bulldozers, backhoes, graders, trucks, choppers/chippers/grinders, chainsaws, etc.) would be used to deliver materials and conduct project work. All of these machines typically have a dBA between 65 and 100, at a distance of 50 feet (USEPA, 1971). No impacts would be anticipated from noise producing activities since these activities would be confined to daylight hours to avoid nuisance noise in the evening hours.

Socioeconomics

Redstone Arsenal, as a major employer in Madison County, influences the local economy through direct employment of civilian and military personnel as well as through the local procurement of goods and services. Direct employment by RSA as well as employment directly generated from RSA's procurement expenditures has led to an increase in the level of economic activity and the creation of additional employment opportunities in the area. A slight positive impact to the local economy would be anticipated to result from the Preferred Alternative from the creation of temporary jobs.

Water Resources, Geology and Soils

Section 401 of the CWA provides ADEM with sole authority regarding state water quality certification of federal permits. ADEM reviews permits submitted to the USACE under Section 401 of the CWA in order to determine whether or not a project will cause or contribute to a violation of Alabama water quality standards. ADEM applies technical standards, administrative requirements, and BMP conditions, as appropriate, to ensure the protection of water quality, and to ensure consistency with Alabama National Pollutant Discharge Elimination System (NPDES) rules and other water quality protection efforts.

Section 402 of the CWA NPDES rules require an owner to register construction activities and associated areas one acre or greater in size. In addition, construction activities less than one acre in size that are determined by ADEM to have significant potential to cause or contribute to water quality impairment, may be required to register. These rules require that a Construction Best Management Practices Plan (CBMPP), prepared by a qualified credentialed professional (QCP), be fully implemented and effectively maintained for all projects requiring NPDES registration (ADEM, 2004).

Surface Water – Several streams pass through the Proposed Action areas including McDonald Creek, Indian Creek, and Huntsville Spring Branch. These surface waters, like the majority of tributaries on the Installation, flow to the south toward Wheeler Reservoir, which is part of the Tennessee River system.

Groundwater - The hydrogeology of the Proposed Action areas is composed of three distinct hydrogeologic units: the unconsolidated surficial deposits (regolith), Tuscumbia Limestone and the Fort Payne Chert, and the

Chattanooga shale. The upper regolith and Chattanooga shale both act as confining layers for the limestone aquifer. This produces artesian conditions over some of the Proposed Action areas.

Groundwater movement is generally from north to south throughout the Proposed Action areas, although localized, often complex, disruptions of this southerly flow pattern may occur. The direction of groundwater flow is ultimately controlled by the Tennessee River, which forms the southern border of Madison County (Rheams *et al,* 1992). Groundwater in solution channels along bedding planes and joint system in the limestone moves generally down the slope of the overlying limestone beds. Groundwater has been shown to move downward through the limestone to the shale-confining unit then laterally to points of discharge to the south and southeast (Malmberg, 1957). In many areas the unconsolidated surficial deposits also act as a confining unit producing artesian pressure in the limestone aquifer. The aquifers in this area are some of the most productive in Madison County. None of the aquifers in Madison County have been designated as sole source aquifers per Section 1424(2)g of the SDWA of 1974. Groundwater from wells drilled into the limestone aquifer generally produces good quality water that is moderate in dissolved minerals and has an average pH of 7.5 (U.S. Army Missile Command, 1994).

Geology and Soils - Madison County is predominantly underlain by thick sequences of carbonate rocks, which generally dip to the south at approximately 20 feet per mile. During geologic periods of time in which seas inundated this area, sediments were deposited and later consolidated to form the carbonate rock sequences. Bedrock formations in this area range in age from Ordovician to Pennsylvanian (Lamoreaux, 1989). Tuscumbia Limestone and Fort Payne Chert are the only two formations mapped within the Proposed Action areas. Generally speaking, Tuscumbia Limestone underlies the southern half of the project area, while Fort Payne Chert underlies the northern half of the Proposed Action areas (US Army Missile Command, 1994).

A complex assemblage of soil types occurs in the Proposed Action areas. This includes numerous clays and loams that are found in upland and lowland areas. The area south of Buxton Road is the largest previously undisturbed zone in the Proposed Action area where heavy equipment would be operated (outside of wetlands). Soils mapped in this area beginning at Buxton Road and proceeding south are Emory silt loam (rarely flooded), Decatur silty clay loam, Etowah loam (rarely flooded), Ketona silt loam (ponded), Waynesboro loam, Swafford fine sandy loam (rarely flooded), Ketona-Chenneby Complex (frequently flooded) and the Egam silt loam complex (occasionally flooded), adjacent to the Tennessee River.

Construction, repair and/or replacement of perimeter fencing would require limited clearing for equipment access. In addition, clearing and grubbing in upland areas would occur adjacent to the fence line to provide thoroughfares for vehicle patrols along the perimeter. Disturbed areas would be seeded and left in a smooth condition. A NPDES construction permit from ADEM would be required since soil disturbances are cumulatively at least one acre. Heavy machinery utilized to remove vegetation and improve fencing would not be operated in wetland areas to eliminate the potential for increased soil movement within these areas.

The surface relief along the fence line is relatively flat and the region receives 50-60 inches of annual precipitation. Some soil erosion in upland areas would initially occur after clearing and grubbing in uplands. In addition, trash and toxic substances from construction equipment and vehicles could potentially be washed into surface waters and groundwater. The following BMPs would be used to reduce the potential for soil erosion and water quality degradation to a less than significant level:

- Disturbed soils would be reseeded or planted in accordance with the Installation's Erosion Control Plan. Final cover of 90% or more would be achieved.
- Erosion controls practices (e.g., placement of silt fence and hay bales) would be implemented in accordance with the Erosion Control Plan for Redstone Arsenal.
- Hazardous materials would not be stored on-site overnight to avoid inadvertent releases.
- Hazardous waste would be removed daily and disposed of off-site in accordance with all state and federal laws.
- The contractor's CBMPP would be implemented.
- All BMPs identified in ADEM's water quality certification would be followed.

A rough aggregate road is proposed to be built across an NWI wetland located approximately ¼-mile north of Martin Road to allow for safe vehicle passage. Placement of aggregate material in waters of the United States would require a dredge and fill permit from the USACE and water quality certification from ADEM.

Conflicts with Federal, State, or Local Land Use Plans, Policies, and Controls

The Proposed Action will upgrade the perimeter fencing in areas designated for several uses specified in the *Real Property Master Plan, Land Use Analysis, Redstone Arsenal, Alabama* (1999), and is consistent with current Installation land use plans. The upgrading of perimeter fencing will promote the compatible and coordinated use of the land. Conflicts with federal, regional, state, or local land use plans, policies, or controls are not anticipated.

Energy Requirements and Conservation Potential

Anticipated energy requirements of program activities could be accommodated within the energy supply of the region. Energy requirements will be subject to any established energy conservation practices.

Natural or Depletable Resource Requirements and Conservation Potential

Other than the use of necessary construction materials and construction vehicle fuels, no significant use of natural or depletable resources is required by the Proposed Action.

Irreversible or Irretrievable Commitment of Resources

The amount of materials and energy required for the Proposed Action is relatively small. Although the proposed activities will result in some irreversible and irretrievable commitment of resources such as wood, concrete, metals, minerals, and labor, this commitment of resources is not significantly different from that necessary for many other similar programs. It is similar to the fence maintenance activities that have been carried out on RSA over recent years. No significant losses of natural resources are anticipated due to the Proposed Action.

Adverse Environmental Effects that Cannot be Avoided

Adverse environmental effects that cannot be avoided include fugitive dust (particulate matter) and construction equipment emissions; noise from construction activities; the disturbance of soils; and the loss of some natural habitat. However, through implementation of the program actions and mitigations described within this document, these effects can be minimized.

Relationship between Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

The Proposed Action will be undertaken in accordance with the RSA Master Plan EA (US Army Missile Command, 1994) that provides a management tool to aid in making operational support decisions by incorporating the concept of comprehensive planning.

Federal Actions to Address Environmental Justice in Minority and Low-Income Populations

As RSA is a military installation and the proposed project is within an area designated for training, no residential communities or businesses are present. Thus, there are no adverse effects to minority or low-income populations.

IMPACT COMPARISON

The following environmental impact matrix presents a summary of Alternative 1, the Preferred Alternative, and Alternative 2, the No Action Alternative.

Environmental Impact Matrix 1

Environmental Components	Alternative 1, The Preferred Alternative	Alternative 2, No Action Alternative
Air Quality	No Significant Impact (short-term-construction-related impacts)	No Impact
Biological Resources	No Significant Impact (short-term construction-related impacts and some loss of wildlife habitat, Dredge and Fill permit and Water Quality Certification required)	No Impact
Cultural Resources	No Impact	No Impact

Geology and Soils	No Significant Impact (short-term construction-related impacts)	No Impact
Hazardous Materials and Waste	No Significant Impact	No Impact
Health and Safety	No Significant Impact	No Impact
Infrastructure and Transportation	No Significant Impact (short-term construction-related impacts)	No Impact
Land Use	Slight Positive Impact (utilization of mostly formerly disturbed areas)	No Impact
Noise	No Significant Impact (short-term construction-related impacts)	No Impact
Socioeconomics	Slight Positive Impact (temporary construction-related employment)	No Impact
Water Resources	No Significant Impact (NPDES permit required)	No Impact

Alternative 1, the Preferred Alternative, to repair, replace and/or install perimeter fence as necessary along the west, north, and east sides of Redstone Arsenal; presents no significant impacts to environmental resources. No negative cumulative impacts occur under this alternative. Any impacts that might result can be mitigated. Alternative 2, the No Action Alternative, will result in no change and no impacts.

INADVERTENT DISCOVERIES

No Phase I archaeological survey, despite an intense effort and excellent research sampling strategy, precludes the possibility that an archaeological site may be discovered during subsequent clearing activities. Federal cultural resource preservation statutes mandate that should artifacts become apparent during construction or clearing, such materials should be identified and evaluated by an archaeologist. Should human remains be encountered, federal statutes specify that work shall cease immediately and the proper authorities be notified. (*Federal Register, Rules and Regulations*, Dec. 4, 1995, Vol. 60, No. 232:62161, Section 10.5).

MITIGATIVE MEASURES, LICENSES, AND PERMITS

The selected contractor will obtain and comply with all applicable federal, state, and local laws and regulations.

Mitigative Measures:

- **Air--Fugitive dust:** During ground-disturbing activities, regular site-watering practices will be implemented as necessary.
- **Air--Vehicle emission:** Contractors will implement and follow construction BMPs and ensure that construction vehicles have standard vehicle emissions control devices.
- **Biology--Protected and Sensitive Species:** Measures would be taken to ensure there would be no harmful discharges to groundwater or surface water during project activities. No pest management operations would be conducted in the northwestern section of the project area. Project areas where sensitive species are known to or could occur would be monitored and protective measures would be implemented (e.g., limiting access) to assure impacts are avoided.

- **Biology--Trees:** Trees that do not interfere with construction activities and are at least five inches in diameter will be saved.
- **Biology--Wetlands:** Vegetation removal in wetlands would be completed with the use of hand tools (no mechanized clearing would be conducted) to avoid soil disturbance in wetlands. Removed vegetation and debris would not be placed in or adjacent to wetlands.
- **Biology--Wildlife:** Occupied nests of birds that are protected under the Migratory Bird Treaty Act would be flagged prior to work activities and avoided until the young have fledged. When practical, clearing of vegetation would occur outside of the main nesting season (April-July). Driving speeds would be limited to minimize collisions with wildlife.
- **Cultural Resources**--Cemeteries: All cemeteries must have at least a 50-foot buffer.
- **Cultural Resources**--NRHP Recommended Sites: All ground disturbance (e.g., placement of post holes and logging with heavy machinery) would be avoided in archeological sites and within a 50-foot buffer. Alternately, further archeological investigation would be conducted and clearance from DES would be obtained prior to conducting ground disturbing activities.
- **Health and Safety**: Army Regulation 385-100, *Safety*, and all appropriate OSHA regulations including CFR 29 Part 1926, Safety and Health Regulations for Construction, would be followed during project activities. Due to the proximity of the project to test ranges, the contractor would be given a mandatory UXO safety briefing. UXO support is required in the Northwest section of the installation that borders I-565. All activities within and adjacent to active ranges would be coordinated with the range safety personnel prior to activities. The selected contractor will comply with all applicable Federal, state, and local laws and regulations.
- **Hazardous Materials/Waste:** Any hazardous materials/waste generated from construction will be identified, removed from the site, and disposed in accordance with current regulations.
- **Land Use:** Project activities would be scheduled with the tenants to minimize impacts to their activities.
- **Noise:** Noise-producing construction activities will be confined to normal working hours to minimize noise impacts.
- **Water Resources and Soils--Erosion:** BMPs for erosion control, topsoil management, and revegetation will be practiced. Erosion control during construction activities will include using hay bales and silt fencing or other devices to prevent soil movement into drainage ditches or low-lying areas. Denuded areas would be revegetated with native species. Final results of 90% ground cover would be achieved in accordance with the Installation's Erosion Control Plan. All conditions specified in the NPDES permit and associated documents as well as conditions specified by ADEM, EPA and USACE will be followed. The contractor will determine site-specific geotechnical conditions.
- **Infrastructure:** Interruptions to the roadway system outside the proposed construction areas will be scheduled in advance.

Permits:

- **Air:** Title V Air Permit (Permit #: 7090007) issued by ADEM to RSA on July 7, 2003. Allows RSA to regulate all emission sources under one permit.
- **Solid Waste:** The landfill has a permit from ADEM (No. 45-03) that is valid until October 8, 2006.
- **Wastewater Treatment:** Tetra Tech, Inc., central plant owner-operator, holds National Pollutant Discharge Elimination System Permit Number AL0000019.
- **Storm Water:** Contractor will obtain a NPDES storm water construction permit from ADEM.
- **Section 404:** One Section 404 permit will be obtained for the construction of the aggregate road located approximately ¼ mile north of Martin Road near the western boundary of the installation prior to beginning work.

APPENDIX A

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APPENDIX B

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AGENCIES/ORGANIZATIONS SENT COPIES OF THE ASSESSMENT
To meet CEQ Regulations of NEPA, U.S. Army is circulating this EA to:
Alabama State Historic Preservation Office, Montgomery, Alabama
U.S. Army Corps of Engineers, Decatur, Alabama
U.S. Army Garrison-Redstone, DES, Natural Resources, Redstone Arsenal, Alabama.
U.S. Army Garrison-Redstone, DPW, Master Planning Division, Redstone Arsenal, Alabama.
U.S. Environmental Protection Agency, Region IV, Office of Environmental Assessment, Atlanta, Georgia.
U.S. Fish and Wildlife Service, Ecological Services Division, Daphne, Alabama.

APPENDIX C
CONTROL OPTIONS FOR GENERAL CONSTRUCTION OPEN SOURCES OF PM-10

Emission Source	Recommended Control Method(s)
Debris handling	Wind speed reduction Wet suppression
Truck transport	Wet suppression Paving Chemical stabilization
Bulldozers	Wet suppression
Pan scrapers	Wet suppression of travel routes
Cut/fill material handling	Wind speed reduction Wet suppression
Cut/fill haulage	Wet suppression Paving Chemical stabilization
General construction	Wind speed reduction Wet suppression Early paving of permanent roads

Source: "Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources," AP-42, Fifth Edition, January 1995. Office of Air Quality Planning and Standards, Office of Air and Radiation, U.S. Environmental Protection Agency.

[a] Dust control plans should contain precautions against watering programs that confound trackout problems.

[b] Loads should be covered to avoid loss of material in transport, especially if material is transported offsite.

[c] Chemical stabilization is usually cost-effective for relatively long-term or semi-permanent unpaved roads.

[d] Excavated materials may already be moist and not require additional wetting. Furthermore, most soils are associated with an "optimum moisture" for compaction.

APPENDIX D
CRITERIA, THRESHOLDS, AND METHODS FOR IMPACT ASSESSMENT

Subject Area/ Resource Category	Criteria	Threshold	Method
EPA or State of Alabama appropriate methods	Air quality exceedance	Emits pollutants above air emission limits established in Redstone Arsenal's permit; contributes substantially to an existing or projected air quality violation; or exposes sensitive receptors to substantial pollutant concentrations	
Biological Resources • Flora and Fauna • Threatened and Endangered Species	Ecosystem integrity Adverse impacts to Federal- and/or state-listed threatened and endangered species or species proposed for Federal or state listing as threatened or endangered or nesting birds protected by the Migratory Bird Treaty Act	Causes alteration of more than 10% of a "natural community" to a nonnatural status; reduces a wildlife population to below self-sustaining levels; or introduces or increases prevalence of noxious weeds or new exotic species. Causes mortality, critical habitat loss, or lowered reproductive success (Endangered Species Act) or causes direct impacts or disturbance to multiple nesting birds protected by the Migratory Bird Treaty Act	Professional standards/best professional judgment; biological monitoring Professional standards/best professional judgment (survey); record taking
Cultural Resources	Sites, structures, or objects listed or eligible for listing in the NRHP or National Landmarks	Effect or adverse effect as defined by the National Historic Preservation Act (1966, as amended)	Professional standards/best professional judgment
Geology and Soils	Soil loss due to erosion	Does not affect prime farmland	professional standards/best professional judgment

Subject Area/ Resource Category	Criteria	Threshold	Method
Hazardous Materials and Waste	Compliance with regulatory guidelines	Hazardous materials or waste not handled/disposed appropriately	DoT, EPA, and OSHA regulations
Health and Safety	Compliance with OSHA, EPA, and DoT regulations	Activities that affect the well-being, safety, or health or workers or members of the public	29 CFR (OSHA), 40 CFR (EPA), 49 CFR (DoT) and AR 385-100
Infrastructure and Transportation	Infrastructure or transportation change	Results in a substantial alteration of the present infrastructure or transportation	Professional standards/best professional judgment
Land Use	Land use change	Results in a substantial alteration of the present or planned land use of Redstone Arsenal or increases visual contrast beyond the visual resource measure class objective for the location	Professional standards/best professional judgment; visual quality analysis1
Noise	Noise-generating activities	65 dBA for compatible land uses; less than 65 dBA Ldn for residential and other noise-sensitive land uses	RSA's Installation Compatible Use Zone Program; City of Huntsville Noise Ordinance 88-663
Socioeconomics	Population growth, income levels, unemployment, and environmental justice	Causes more than 10% change in population levels over historic baseline; increase unemployment by more than local projections; causes per capita income to drop below poverty level; or causes adverse environmental, economic, social, or health impacts to be disproportionately placed on minority or low-income populations (Executive Order 12898)	Socioeconomic analysis and human health and environmental analysis.

Subject Area/ Resource Category	Criteria	Threshold	Method
Water Resources • Surface and Groundwater • Wetlands	Water quality violates CWA Section 404 or Rivers and Harbors Act of 1899; or violates permit conditions or mitigation requirements for previously authorized activities	Exceeds or violates Alabama water quality standards or objectives, including National Pollutant Discharge Elimination System permitted outfalls Unauthorized activities occurring within jurisdictional waters of the United States; failure to meet specific permit conditions or mitigation requirements	EPA or State of Alabama approved methods Best professional judgment or enforcement action by the USACE or ADEM

APPENDIX E
CLEAN AIR STANDARDS

NAAQS and Alabama Ambient Air Quality Standards

Pollutants	Averaging Period	Primary Ambient Air Quality Standards	Secondary Standard
Sulfur Dioxide	3-hour Average 24-hour Average Annual Arithmetic Mean	--- 0.14 ppm (365 µg/m3) 0.03 ppm (80 µg/m3)	0.5 ppm (1300 µg/m3) --- ---
Particulates < 2.5 µm (PM 2.5)	24-hour Average* Annual Arithmetic Mean*	65 µg/m3 15 µg/m3	65 µg/m3 15 µg/m3
Particulates < 10 µm (PM 10)	24-hour Average Annual Arithmetic Mean	150 µg/m3 50 µg/m3	150 µg/m3 50 µg/m3
Carbon Monoxide	1-hour Average 8-hour Average	35 ppm (40 mg/m3) 9 ppm (10 mg/ m3)	--- ---
Ozone	1 hour 8 hour*	0.12 ppm (235 µg/m3) 0.08 ppm (157 µg/m3)	0.12 ppm (235 µg/m3) 0.08 ppm (157 µg/m3)
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 ppm (100 µg/m3)	0.53 ppm (100 µg/m3)
Lead	Quarterly Average	1.5 µg/m3	1.5 µg/m3

Note: µm = micrometers, µg/m3 = micrograms per cubic meter, and ppm = parts per million
Parenthetical value is an approximate equivalent concentration.
*The ozone 8-hour standard and the PM 2.5 standards are included for information only. A 1999 Federal court ruling blocked implementation of these standards, which EPA proposed in 1997. EPA has asked the U.S. Supreme Court to reconsider that decision.

APPENDIX F

CONDITIONS NORMALLY REQUIRING AN ENVIRONMENTAL IMPACT STATEMENT

The potential impacts arising from the proposed upgrading of the perimeter fence were evaluated specifically in the context of the criteria for actions requiring an Environmental Impact Statement described in DoD Directive 4715.9, *Environmental Planning and Analysis* (U.S. Department of Defense, 1996), and AR 200-2, *Environmental Analysis of Army Actions* (U.S. Department of the Army, 2002). Specifically, the proposed project activities were evaluated for their potential to:

- significantly affect environmental quality or public health and safety; significantly affect historic or archaeological resources, public parks and recreation areas, wildlife refuge or wilderness areas, wild and scenic rivers, or aquifers;
- establish a precedent for future actions;
- adversely affect properties listed or meeting the criteria for listing on the National Register or the National Registry of Natural Landmarks;
- significantly affect prime and unique farmlands, wetlands, ecologically or culturally important areas, or other areas of unique or critical environmental concern;
- result in significant and uncertain environmental effects or unique or unknown environmental risks;
- significantly affect a species or habitat listed or proposed for listing on the Federal list of endangered or threatened species;
- adversely interact with other actions resulting in cumulative environmental effects; and
- involve the use, transportation, storage, and disposal of hazardous or toxic materials that may have significant environmental impact.

APPENDIX G
PUBLIC NOTICE

APPENDIX H
LETTERS OF CONSULTATION

READ

United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Drawer 1190
1208-B Main Street
Daphne, Alabama 36526

IN REPLY REFER TO

04-1564

September 3, 2004

Mr. Daniel J. Dunn
Chief, Natural Resources Division
U.S. Army Aviation and Missile Command
Redstone Arsenal, AL 35898-5000

Dear Mr. Dunn:

Thank you for your letter requesting concurrence with the Draft Environmental Assessment in support of the proposal to repair, replace and/or install a perimeter fence along the west, north, and east perimeter of Redstone Arsenal, Alabama. We have reviewed the information you enclosed and are providing the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The Service believes that this project is not likely to adversely affect listed species. Therefore, no further endangered species consultation will be required for this project unless: 1) the identified action is subsequently modified in a manner that causes an effect on listed species or designated Critical Habitat; 2) new information reveals the identified action may affect Federally protected species or designated Critical Habitat in a manner or to an extent not previously considered; or 3) a new species is listed or Critical Habitat is designated under the Endangered Species Act that may be affected by the identified action.

If you need any additional information, please contact Mr. Bruce Porter, at 251-441-5864 and kindly refer to the reference number above.

Sincerely,

for Larry E. Goldman
Field Supervisor

preserveALA
ALABAMA HISTORICAL COMMISSION

September 3, 2004

Mr. Terry W. Hazle, Director
Directorate of Environment and Safety
Department of the Army
U.S. Army Garrison – Redstone
4488 Martin Rd.
Redstone Arsenal, AL 35898-5000

Re: AHC 2004-1326
E.A. for Upgrading Perimeter Fence at
Redstone Arsenal
Madison County

LEE H. WARNER
Executive Director

468 South Perry Street
Montgomery, Alabama
36130-0900

tel 334 242•3184
fax 334 240•3477

Dear Director Hazle,

The Alabama Historical Commission has reviewed the document entitled, *Draft Environmental Assessment for Upgrading the Perimeter Fence at Redstone Arsenal, Alabama*. We concur that there will be no effect on archaeological sites Ma196, Ma191, Ma639, Ma736, Ma538, Ma1181, Ma140/33, and Ma141. We further agree that the potential adverse effect on archaeological sites Ma172 and Ma281 can be alleviated by having a professional archaeologist excavate the fence post holes, screen the soil and record all stratigraphic, feature, and artifactual information. We have one stipulation. Table 2 on page 8 of this document indicates that tree clearing is part of this project. Please do not pull tree stumps from archaeological sites. We recommend grinding any stumps to ground level. If you have any questions contact Tom Maher at the above number. Good luck with your project.

Very truly yours,

Elizabeth Ann Brown
Deputy SHPO